

P a t e n t   c l a i m s

1. Process for producing packs (10) with an outer wrapper (13) made of film, in particular hinge-lid boxes for cigarettes, a film blank which is folded around the pack (10) having folding tabs which are connected to one another by thermal sealing, it being the case that, following the thermal sealing, the film is subjected to heat treatment for the purpose of shrinking the film, **characterized by** the following features:

- 10 a) during the production of packs (10) of the hinge-lid type, said packs are transported in a plurality of, in particular two, pack rows (22, 23) arranged one above the other along a straight conveying path for the purpose of sealing laterally directed folds in the region of end wall (14) and base wall (15),
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- b) following the sealing of the end walls (14) and base walls (15), the cyclically transported pack rows (22, 23) are subjected to heat treatment in the vicinity of the conveying path, preferably (only) in the region of the
- 20 upward-facing front sides of the packs (10).

2. Process according to Claim 1, **characterized by the following features:**

- 5 a) the packs (10) of the top pack row (22) are raised in the region of a shrinking station (26) for the purpose of positioning a (bottom) heating plate (33) between the pack rows (22, 23).
- 10 b) by means of a top heating plate (32) and a bottom heating plate (33) positioned between the pack rows (22, 23), heat is directed downwards in each case only onto the facing (front) side of the packs (10).

15 3. Apparatus for producing packs (10) with an outer wrapper (13) made of film, in particular hinge-lid boxes for cigarettes, a film blank which is folded around the pack (10) having folding tabs which are connected to one another by thermal sealing in the region of a sealing station (25),  
 20 **characterized by the following features:**

- a) the packs (10) can be transported cyclically along a straight conveying path in a plurality of, in particular two, pack rows (22, 23) arranged one above the other,
- 25 b) in a first region of the conveying path (28, 29) the latter is configured as a sealing station (25) with sealing jaws (30, 31) arranged at either side of the conveying path (28, 29) for the purpose of sealing the laterally directed folding tabs,
- 30 c) the sealing station (25) is followed in the region of the conveying path (28, 29) by a shrinking station (26) for the purpose of shrinking the outer wrapper (13) through the application of heat.
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4. Apparatus according to Claim 3, **characterized in that** the shrinking station (26) has movable thermal elements, in particular heating plates (32, 33), which, for the purpose of  
 40 transmitting heat to the packs (10), can be moved against at

least one side of the packs (10), in particular against an upwardly directed front side of the packs (10).

5. Apparatus according to Claim <sup>3</sup>~~3 or 4~~, characterized by the following features:

- a) during transport along the horizontal conveying path (28, 29), the packs (10) of the top pack row (22) can ~~be~~<sup>are</sup> conveyed in the upward direction such that the packs (10) of the top pack row (22) can ~~be~~<sup>are</sup> conveyed over a heating element - heating plate (33) - assigned to the packs (10) of the bottom pack row (23),
- b) the heating plate (33) has an obliquely directed run-on surface (40) for the packs (10) of the top pack row (22),
- c) the run-on surface (40) extends across the full (transverse) extent of the packs (10),
- d) the run-on surface (40) has an oblique edge (47) as a boundary.

6. Apparatus according to Claim 3, characterized in that a pack (10) of the top pack row (22) in a position before it runs onto the bottom heating plate (33) in each case can ~~be~~<sup>is</sup> displaced in the transverse direction onto a laterally arranged ramp (43), and in that, in a further conveying cycle, the pack (10) resting with one side on the ramp (43) can ~~be~~<sup>is</sup> pushed onto the bottom heating plate (33), preferably with a simultaneous sideways-directed return movement into the starting position.

7. Apparatus according to Claim 3, characterized in that the two heating plates (32, 33) can ~~be~~<sup>are</sup> moved up and down together such that, during the advancement of the packs (10), the heating plates (32, 33) can ~~be~~<sup>are</sup> raised from the packs (10) of the top pack row (22) and of the bottom pack row (23).

8. Apparatus according to Claim 7, characterized in that the heating plates (32, 33) are connected to one another by pressure-exerting elements, in particular by lowering springs (51) and lifting springs (52) for the bottom heating plate

(33), the lowering springs (51) and lifting springs (52) preferably being positioned such that, during an upward movement of the top heating plate (32), the bottom heating plate (33) is raised by the lifting springs (52).

9. Apparatus according to Claim 7, **characterized in that** the top heating plate (32) ~~can be~~<sup>is</sup> moved, in particular lowered, by a transversely movable actuating mechanism, transversely movable actuating levers (53, 54) preferably having wedge surfaces (56) which, via supporting rollers (57) connected to the top heating plate (32), move, preferably raise, the top heating plate (32) counter to the loading of pressing-down elements, in particular compression springs (49).

10. Apparatus according to Claim 3, **characterized in that** the thermal elements or heating plates (32, 33) have heating elements (71) which have heat-transmitting elements, in particular very thin metal plates (72), which react immediately to changes in temperature, the packs (10) coming into abutment against the same or being capable of being moved past the same at a small distance therefrom.

11. Apparatus according to Claim 10, **characterized in that** the heating element (71) has sheet-like heating elements, in particular electrical (resistance-)heating wires (73) which are arranged in loops or in meandering form and, on the side which is directed away from the packs (10), are connected to the metal plate (72) ~~or the like~~ via a heat-conducting intermediate layer, in particular amat (74) made of silicone.

12. Apparatus according to Claim ~~10~~<sup>11</sup> ~~or 11~~, **characterized in that** the heating element (71) is of multilayered construction, heating wires (73), on the one hand, and a temperature sensor (76), on the other hand, being positioned between a plurality of mats (74, 75, 77), and the layers, namely metal plate (72) and mats (74, 75, 77), being connected to one another to form a unit by adhesive bonding or vulcanization.

13. Apparatus according to Claim 12, **characterized in that** the unit-design heating element (71) is positioned within a

recess (70) of the heating plate (32, 33) by way of a moldable embedding compound (79), in particular made of silicone.

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FOC-636

27283 Verden

List of designations

|    |                         |    |                    |
|----|-------------------------|----|--------------------|
| 10 | Pack                    | 47 | Edge               |
| 11 | Box part                | 48 | End surface        |
| 12 | Lid                     | 49 | Compression spring |
| 13 | Outer wrapper           | 50 | Supporting plate   |
| 14 | End wall                | 51 | Lowering spring    |
| 15 | Base wall               | 52 | Lifting spring     |
| 16 | Film web                | 53 | Actuating lever    |
| 17 | Blank subassembly       | 54 | Actuating lever    |
| 18 | Folding turret          | 55 | Leg                |
| 19 | Pack path               | 56 | Wedge surface      |
| 20 | Vertical conveyor       | 57 | Supporting roller  |
| 21 | Push-off path           | 58 | Web                |
| 22 | Pack row                | 59 | Connecting rod     |
| 23 | Pack row                | 60 | Connecting rod     |
| 24 | Pusher                  | 61 | Slide bearing      |
| 25 | Sealing station         | 62 | Connection line    |
| 26 | Shrinking station       | 63 | Connection line    |
| 27 | Track plate             | 64 | Lifting arm        |
| 28 | Conveying path          | 65 | Bearing            |
| 29 | Conveying path          | 66 | Handle             |
| 30 | Sealing jaw             | 67 | Connecting leg     |
| 31 | Sealing jaw             | 68 | Crossmember        |
| 32 | Heating plate (top)     | 69 | Guide shoe         |
| 33 | Heating plate (bottom)  | 70 | Recess             |
| 34 | Carrying plate (top)    | 71 | Heating element    |
| 35 | Carrying plate (bottom) | 72 | Metal plate        |
| 36 | Heating element         | 73 | Heating wire       |
| 37 | Heating element         | 74 | Mat                |
| 38 | Line                    | 75 | Mat                |
| 39 | Line                    | 76 | Temperature sensor |
| 40 | Run-on surface          | 77 | Mat                |
| 41 | Holding-down means      | 78 | Line               |
| 42 | Brush                   | 79 | Embedding compound |
| 43 | Ramp                    |    |                    |
| 44 | Transverse pusher       |    |                    |
| 45 | Side guide              |    |                    |
| 46 | Side guide              |    |                    |